Table 8: **gp120**

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Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(2-10 IIIB)	gp120(2-10) RV NOTES: • HIV IIIB protein with HIV-1 IIIB	20(2-10) RVKEKYQHL HIV-1 infection hun TES: HIV IIIB proteins were used to define the range of CTL epitopes recognized by 3 with HIV-1 IIIB	HIV-1 infection CTL epitopes recognized	human(B8) [Sipsas97] by 3 lab workers accidentally infected	[Sipsas97] ntally infected
	Type-specii other subtyRVKGIRKThis epitop	Type-specific epitope, unique to the LAI and IIIB because of a deletion of three amino acids that are present in all other subtype B HIV-1s RVKGIRKNYQHL, a variant found in JRCSF, was not recognized This epitope is in the signal sequence of gp120	because of a deletion of t not recognized	hree amino acids that are	present in all
gp160(30-39 WEAU)	gp120(30-39)	AENLWVTVYY	HIV-1 infection	human(B44)	[Borrow97, Goulder97e]
	NOTES: • Two CTL 1 other (A)A	TES: Two CTL lines from the patient WEAU were studied – one had an optimal peptide of (A)AENLWVTVYY, and the other (A)AENLWVTVY, and both responded equally well with one or two N-term Alanines	ed – one had an optimal p	eptide of (A)AENLWVT	VYY, and the
	• The natural TENLWV7 AANLWV • The glutam • [Goulder97	The naturally occurring forms of the peptide found in WEAU were tested as targets for early WEAU CTLs – the t TENLWVTVY was as reactive as the wild type AENLWVTVY – but the forms AKNLWVTVY, AGNLWVT AANLWVTVY did not serve as targets The glutamic acid in the second position is a B44 anchor residue [Goulder97e] is a review of immune escape that summarizes this study in the context of CTL escape to fixation	n WEAU were tested as ta ENLWVTVY – but the f nchor residue mmarizes this study in the	argets for early WEAU CTLs – the form orms AKNLWVTVY, AGNLWVTVY, econtext of CTL escape to fixation	TLs – the form SNLWVTVY, o fixation
gp120(32-56 LAI)	gp120(30-54) NOTES: • HLA restri	20(30-54) TEKLWVTVYYGVPVWKE- gp160 vaccinia ATTTLFCA vaccine TES: HLA restricted CTL response to epitope in HIV-1 vaccinia-env vaccinees	gp 160 vaccinia vaccine vaccinia-env vaccinees	human(B18)	[Johnson94c]
gp120(32-56 LAI)	gp120(30-54)	TEKLWVTVYYGVPVWKE- ATTTLFCA	gp160 vaccinia vaccine	human(B18)	[Hammond95]
	NOTES: • This peptid	TES: This peptide can be processed for HLA-B18 presentation in a TAP-1/2 independent pathway	tation in a TAP-1/2 indep	endent pathway	
gp120(32-41 LAI)	gp120(32-41) NOTES: • CTL from l	20(32-41) KLWVTVYYGV (TES: CTL from HLA-A2 positive subject react with this peptide	MN rec gp160 peptide	human(A2)	[Dupuis95]

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(25-46 BRU)	gp120(33-54)	LWVTVYYGVPVWKEATT- TLFCA	HIV-1 infection	human(A2)	[Dadaglio91]
	NOTES: • Defined thr	TES: Defined through peptide blocking of CTL activity, and Env deletions	, and Env deletions		
gp120(env 48)	gp120(35-45) NOTES:	VTVYYGVPVWK	HIV-1 infection	human(A11 and A*6801)	[Threlkeld97]
	 Study of the A*3101, A* 	Study of the fine specificity of an A3-like-HLA-super-type epitope (the A3-super-type includes A*0301, A*1101, A*3101, A*3301, and A*6801)	super-type epitope (the A	3-super-type includes A*()301, A*1101,
	 The A3 suppositive chapositive most this epitope 	The A3 super-type is characterized as a hydrophobic or hydroxyl containing anchor residue at position 2, and a positive charge in the C-term position While most lines were specific, a promiscuous cloned CTL line was derived from an HIV+ donor that could recognize this epitope presented by either A11 or A*6801	nobic or hydroxyl contain	ing anchor residue at position 2, and a from an HIV+ donor that could recognize	sition 2, and a ould recognize
gp120(37-46 LAI)	gp120(36-45)	TVYYGVPVWK	gp160 vaccinia vaccine	human(A3.1)	[Johnson94]
	NOTES: • Multiple C7	OTES: Multiple CTL clones obtained from two vaccinees	S		
gp120(38-41 LAI)	gp120(36-45)	TVYYGVPVWK	gp160 vaccinia vaccine	human(A3.1)	[Johnson94c]
	NOTES: • Highly cons	YIES: Highly conserved epitope recognized by multiple CTL clones from vaccinee	CTL clones from vaccine	Ö	
gp120(37-46 LAI)	gp120(36-45)	TVYYGVPVWK	gp160 vaccinia vaccine	human(A3.1)	[Hammond95]
	NOTES: • This peptide	TES: This peptide can be processed for HLA-A3.1 presentation in a TAP-1/2 independent pathway	sentation in a TAP-1/2 ind	ependent pathway	
gp120(37-46 LAI)	gp120(36-45) NOTES:	TVYYGVPVWK	HIV-1 infection	human(A3)	[Goulder97, Goulder97e]
	Identical twOne had a r[Goulder97	Identical twin hemophiliac brothers were both infected with the same batch of factor VIII One had a response to this epitope, the other did not [Goulder97e] is a review of immune escape that summarizes this study	ected with the same batch oot ummarizes this study	of factor VIII	

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(42-51 PV22)	gp120(41-50)	VPVWKEATTT	HIV-1 infection	human(B55)	[Brander95a]
	NOTES: • P. Johnson, unpublished	unpublished			
gp120(42-52	gp120(41-51)	VPVWKEATTTL	HIV-1 infection	human(B35)	[Cao97]
	NOTES: • VPVWKE/ • VPVWKD/ • VPVWKE/ • VPVWKE/	VPVWKEATTTL is the consensus sequence for clades B and D VPVWKDAETTL is the consensus sequence for clade A and it is cross-reactive VPVWKEADTTL is the consensus sequence for clade C and it is cross-reactive VPVWKEADTTL is the consensus sequence for clade E and even with three substitutions still retains some cross-reactivity	des B and D ade A and it is cross-react ade C and it is cross-react ade E and even with thre	tive tive e substitutions still retain	s some cross-
gp120(49-68)	gp120(41-60) NOTES: • HIV-specifi	 VPVWKEATTTLFCASDAKAY HIV infection OTES: HIV-specific CTL lines developed by ex vivo stimulation with peptide 	HIV infection ation with peptide	human	[Lieberman95]
gp120(49-68 SF2)	gp120(41-60) NOTES:	VPVWKEATTTLFCASDAKAY	HIV infection	human	[Lieberman97]
	 Of 25 patie 11 subjects Three of the The respone	Of 25 patients, most had CTL specific for more than 1 HIV-1 protein 11 subjects had CTL that could recognize vaccinia expressed LAI gp160 Three of these 11 had CTL response to this peptide The responding subjects were HLA-A2, A3, B8, B62; HLA-A3, A24, B7, B38	x 1 HIV-1 protein expressed LAI gp160 2; HLA-A3, A24, B7, B	38	
gp120(49-68 SF2)	gp120(41-60) NOTES:	VPVWKEATTTLFCASDAKAY	HIV-1 infection	human	[Lieberman97b]
	CTL expan	• CTL expanded ex vivo were later infused into HIV-1 infected patients	l infected patients		
gp120(59-78)	gp120(51-70) NOTES:	LFCASDAKAYDTEVHINVWAT	HIV infection	human	[Lieberman95]
	HIV-specifi	HIV-specific CTL lines developed by ex vivo stimulation with peptide	ation with peptide		

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(59-78 SF2)	gp120(51-70) NOTES: Of 25 patie 11 subjects One of thes	120(51-70) LFCASDAKAYDTEVHINVWAT HIV infection TTES: Of 25 patients, most had CTL specific for more than 1 HIV-1 protein 11 subjects had CTL that could recognize vaccinia expressed LAI gp160 One of these 11 had CTL response to this peptide The responding subject was HLA-A2 and B-21	HIV infection n 1 HIV-1 protein expressed LAI gp160	human	[Lieberman97]
gp120(59-68 HXB2)	gp120(51-60)	LFCASDAKAY	HIV-1 infection	human	[Lieberman92]
	NOTES: • CTL epitop	OTES: • CTL epitope defined by T cell line and peptide mapping	ping		
gp120(53-62 LAI)	gp120(51-60) NOTES: • Uncertain v	o120(51-60) LFCASCAKAY OTES: Uncertain whether optimal, binds A24 as well	HIV-1 infection	human(B38)	[Shankar96]
gp120(69-88 SF2)	gp120(61-79) NOTES:	DTEVHNVWATHACVPTDPN	HIV-1 infection	human	[Lieberman97]
	 Of 25 patie 11 subjects One of thes The respon	Of 25 patients, most had CTL specific for more than 1 HIV-1 protein 11 subjects had CTL that could recognize vaccinia expressed LAI gp160 One of these 11 had CTL response to this peptide The responding subject was HLA-A2 and B-21	n 1 HIV-1 protein expressed LAI gp160		
gp120(77-85)	gp120(77-85) NOTES:	DPNPQEVVL	HIV-1 infection	human(B*3501)	[Ogg98]
	• This epitop HLA A*02	This epitope was included to illustrate the specificity of HIV-tetrameric staining, in a HLA A*0201 CTL effector cells and low viral load	of HIV-tetrameric stainir	g, in a cross-sectional study correlating	dy correlating
gp120(77-85 SF2)	gp120(77-85) NOTES:	DPNPQEVVL	HIV-1 infection	human(B35,B51)	[Shiga96]
	Binds HLA	 Binds HLA-B*3501 and B*5101 – binds and kills gp120-vaccinia virus infected cells carrying B35 or B51 	gp120-vaccinia virus infe	cted cells carrying B35 or	B51

Location gp120(77-85 SF2)	gp1	Immunogen HIV-1 infection was obtained	Species(HLA) human(B*3501)	_
	 A CTL clone responsive to this epitope was obtained 2/7 B35 positive individuals have a CTL response to this epitope This epitope is highly variable The substitutions: 1N, 3S and 7I, 7L and 9M, 8I, 8K all abrogate specific CTL lysis, while only 8K reduces binding to B*3501 The substitution 8V to 8E does not reduce specific CTL activity 	vas obtained response to this epitope 19M, 8I, 8K all abrogate spe specific CTL activity	cific C	cific CTL lysis, while only 8K
gp120(111-126 IIIB)	gp120(103-118) MQEDIISLWDQSLKPC primary <i>in vitro</i> huma response to peptide NOTES: • Primary CTL response with cells from non-infected donors stimulated by the peptide	primary <i>in vitro</i> response to peptide on-infected donors stimulated by t	vitro peptide ated by t	vitro human peptide ated by the peptide
gp120(112-124 IIIB)	gp120(104-116) HEDIISLWDQSLK HIV-1 inference of the Helper and cytotoxic T cells can be stimulated by this peptide (T2)	HIV-1 infection ulated by this peptide (T2)	ection	ection human(A2)
gp120(MN)	 gp120(104-116) HEDIISLWDQSLK HIV-1 infection chimpanzee [Lubeck97] NOTES: No epitope-specific CTL were detected in chimpanzees immunized with adenovirus-HIV-1 MN gp160 recombinant despite a response to peptides P18 and T1 Helper and cytotoxic T cells have been found to be stimulated by this peptide (T2) 	HIV-1 infection n chimpanzees immunized wit	fection zed with ac y this pepti	fection chimpanzee zed with adenovirus-HIV-1 MN gp this peptide (T2)
gp120(112-124 IIIB)	gp120(104-116) HEDIISLWDQSLK HIV exposure NOTES: • CTL and T helper cell reactivity in healthcare workers exposed to HIV	HIV exposure	o HIV	osure human o HIV
gp120(119-139 SF2)	 gp120(111-129) WDQSLKPCVKLTPLCVSLK HIV-1 infection NOTES: Of 25 patients, most had CTL specific for more than 1 HIV-1 protein 11 subjects had CTL that could recognize vaccinia expressed LAI gp160 One of these 11 had CTL response to this peptide The responding subject was HLA-A2 and B-21 	VSLK HIV-1 infection r more than 1 HIV-1 protein e vaccinia expressed LAI gp16 s peptide d B-21	nfection rotein AI gp160	afection human rotein AI gp160

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(120-128 LAI)	gp120(120-128)	KLTPLCVTL	MN rec gp160	human(A2)	[Dupuis95]
	NOTES: • CTL from HI	OTES: - CTL from HLA-A2 positive subject react with this peptide	ptide		
gp120(120-128)	gp120(120-128) NOTES:	KLTPLCVTL	HIV-1 infection	human(A2)	[Kundu98]
	 Allogeneic de HIV-1 epitope 1/6 showed ir proliferative r KLTPLCVTL direct sequene CTL demonst 	Allogeneic dendritic cells (DCs) were obtained from HLA-identical siblings, pulsed with rgp160 MN or A2 restricted HIV-1 epitope peptides, and infused monthly into six HIV-infected patients 1/6 showed increased env-specific CTL and increased lymphoproliferative responses, 2/6 showed increase only in proliferative responses, and 3/6 showed no change – pulsed DCs were well tolerated KLTPLCVTL is a conserved HLA-A2 epitope included in this study – all six patients had this sequence as their HIV direct sequence, and a detectable CTL response CTL demonstrated against peptide-coated target, epitope is naturally processed and enhancible with vaccine	LA-identical siblings, pu HIV-infected patients I lymphoproliferative re ulsed DCs were well tol d in this study – all six p	ulsed with rgp160 MN or A2 restricted sponses, 2/6 showed increase only in erated atients had this sequence as their HIV and enhancible with vaccine	A2 restricted rease only in as their HIV ccine
gp120(120-128)	gp120(120-128) NOTES: • Increased CTI	20(120-128) KLIPLCVTL HIV-1 intection human(A2) [Kmieciak9 TES: Increased CTL response to cells expressing a VV construct $\Delta V3$ mutant compared with a full-length env gene product	HIV-1 infection ruct $\Delta V3$ mutant compa	human(A2) ed with a full-length env	[Kmectak98] gene product
gp120(156-165 IIIB)	gp120(160-169)	NCSFNISTSI	HIV-1 infection	human(Cw8)	[Sipsas97]
	NOTES: • HIV IIIB protein with HIV-1 IIIB	TES: HIV IIIB proteins were used to define the range of CTL epitopes recognized by 3 lab workers accidentally infected with HIV-1 IIIB	TL epitopes recognized b	y 3 lab workers accideni	ally infected
	NCSFNITTS:NCSFNISTSIquirement for	NCSFNITTSI, a variant found in HIV-1 MN, was not recognized, thus this epitope was type-specific NCSFNISTSI contains two potential N-linked glycosylation sites and cysteine residue, possibly related to the requirement for a high sensitizing dose of peptide for CTL activity	recognized, thus this episylation sites and cystein TL activity	tope was type-specific te residue, possibly relat	ed to the re-
gp120(193-212	gp120(192-211)	TTSYTLTSCNTSVITQACPK	HIV-1 infection	human(A2)	[Dadaglio91]
	NOTES: • Defined throu	TES: Defined through blocking CTL activity, and Env deletions	ions		

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(199-219 SF2)	gp120(196-215)	SLTSCNTSVITQACPKVSFE	HIV-1 infection	human	[Lieberman97]
	NOTES: Of 25 patients 11 subjects hat One of these The responding	TES: Of 25 patients, most had CTL specific for more than 1 HIV-1 protein 11 subjects had CTL that could recognize vaccinia expressed LAI gp160 One of these 11 had CTL response to this peptide The responding subject was HLA-A2, -B21	1 HIV-1 protein xpressed LAI gp160		
gp120(192-199 HXB2R)	gp120(196-204)	KLTSCNTSV	HIV-1 infection	human(A2)	[Brander95]
THE DEN	NOTES: • Epitope predi	TES: Epitope predicted on HLA binding motif, and studied in the context of inclusion in a synthetic vaccine	d in the context of inclus	ion in a synthetic vaccine	
gp120(197-205)	gp120(196-204)	TLTSCNTSV	no CTL shown	human(A2)	[Garboczi92]
	Crystallizatio	TES: Crystallization of HLA-A2 molecules complexed with antigenic peptides – refers	th antigenic peptides – re	efers to Dadaglio et al 1991)1
gp120(199-207)	gp120(196-204)	TLTSCNTSV	peptide immunization and HIV-1 infection	human(A2.1)	[Brander96b]
	NOTES: This epitope of the property of the pitope of the	TES: This epitope was recognized by PBMC from 6/14 HIV+ asymptomatic patients This epitope was used along with pol CTL epitope ALQDSGLEV and a tetanus toxin T helper epitope for a synthetic vaccine This vaccine failed to induce a CTL response, although a helper response was evident	IV+ asymptomatic patier QDSGLEV and a tetanu gh a helper response was	nts ns toxin T helper epitope f s evident	or a synthetic
gp120(201-225 LAI)	gp120(205-229)	ITQACPKVSFEPIPHYC- APAGFAI	gp160 vaccinia vaccine	human(CD4+ CTL)	[Johnson94, Johnson94c]
	NOTES: • CD4+ CTL is	TES: CD4+ CTL isolated from LAI IIIB gp160 vaccinees			
gp120(209-228)	gp120(206-225) NOTES: • HIV-specific	20(206-225) TQACPKVSFEPIPIHYCAPA HIV infection TES: HIV-specific CTL lines developed by <i>ex vivo</i> stimulation with peptide	HIV infection tion with peptide	human	[Lieberman95]

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(209-228 SF2)	gp120(206-225)	TQACPKVSFEPIPIHYCAPA	HIV infection	human	[Lieberman97]
	NOTES:	TES: Of 25 patients, most had CTL specific for more than 1 HIV-1 protein 11 subjects had CTL that could recognize vaccinia expressed LAI gp160 One of these 11 had CTL response to this peptide	1 HIV-1 protein xpressed LAI gp160		
gp120(209-228	gp120(206-225)	TQACPKVSFEPIPIHYCAPA	HIV-1 infection	human	[Lieberman97b]
01 2)	NOTES: • CTL expande	OTES: CTL expanded ex vivo were later infused into HIV-1 infected patients	infected patients		
gp120(219-238	gp120(216-235)	PIPIHYCAPAGFAILKCNNK	HIV-1 infection	human	[Lieberman92]
18302)	NOTES: • CTL epitope	TES: CTL epitope defined by T cell line and peptide mapping	ping		
gp120(219-238)	gp120(216-235) NOTES:	PIPIHYCAPAGFAILKCNNK	HIV infection	human	[Lieberman95]
	• HIV-specific	 HIV-specific CTL lines developed by ex vivo stimulation with peptide 	ation with peptide		
gp120(241-249 LAI)	gp120(243-251)	CTNVSTVQC	HIV-1 infection	human(Cw8)	[Sipsas97]
	NOTES: • HIV IIIB protein with HIV-1 IIIB	TES: HIV IIIB proteins were used to define the range of CTL epitopes recognized by 3 with HIV-1 IIIB	CTL epitopes recognized	by 3 lab workers accidentally infected	tally infected
	 CTNVSTVQ for a high sen 	CTNVSTVQC contains a potential N-linked glycosylation site and cysteine residues, possibly related to a requirement for a high sensitizing dose of peptide for CTL activity	lation site and cysteine res ty	idues, possibly related to	a requirement
gp120(249-268)	gp120(246-265) NOTES: • HIV-specific	20(246-265) VSTVQCTHGIRPVVSTQLLL HIV infection TES: HIV-specific CTL lines developed by <i>ex vivo</i> stimulation with peptide	HIV infection ation with peptide	human	[Lieberman95]

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(249-268	gp120(246-265)	VSTVQCTHGIRPVVSTQLLL	HIV infection	human	[Lieberman97]
312)	NOTES: Of 25 patients 11 subjects ha One of these The respondir	Of 25 patients, most had CTL specific for more than 1 HIV-1 protein 11 subjects had CTL that could recognize vaccinia expressed LAI gp160 One of these 11 had CTL response to this peptide The responding subject was HLA-2, -B21	1 HIV-1 protein kpressed LAI gp160		
gp120(249-268)	gp120(246-265) NOTES: • CTL expande	o120(246-265) VSTVQCTHGIRPVVSTQLLL HIV-1 infection OTES: CTL expanded ex vivo were later infused into HIV-1 infected patients	HIV-1 infection	human	[Lieberman97b]
gp120(256-275 LAI)	gp120(256-275)	RPVVSTQLLLNGSLAEEEVV	HIV-1 infection	human(B7)	[Shankar96]
gp120(255-263 SF2)	gp120(256-264)	RPIVSTQLL	HIV-1 infection	human(B35)	[Shiga96]
	NOTES: • Binds HLA-B*3501	*3501			
gp120(255-263 SF2)	gp120(256-264)	RPIVSTQLL	HIV-1 infection	human(B*3501)	[Tomiyama97]
	NOTES: • A CTL clone • Only 1/7 B35 • An I to V sub • A Q to H sub:	TES: A CTL clone responsive to this epitope was obtained Only 1/7 B35 positive individuals had a CTL response to this epitope An I to V substitution at position 3 reduces specific lysis, but not binding to B*3501 A Q to H substitution at position 7 abrogates specific lysis, but not binding to B*3501	se to this epitope ysis, but not binding to I lysis, but not binding to	3*3501 B*3501	
gp120(295-312	gp120(295-311)	SVEINCTRPNNNTRKSI	HIV-1 infection	human(A2)	[Dadaglio91]
	NOTES: • Defined throu	TES: Defined through blocking CTL activity, and Env deletions	tions		
gp120(302-312	gp120(302-311)	RPNNNTRKSI	HIV-1 infection	human(B7)	[Safrit94b]
	NOTES: • CTL from two	TES: CTL from two acute seroconversion cases			

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(302-312 HXB2)	gp120(302-311) NOTES:	RPNNNTRKSI	HIV-1 infection	human(B7)	[Hammond95]
	Peptide proceCTL from an	Peptide processed by a TAP-1/2-dependent pathway only CTL from an acute seroconverter	only		
gp120(302-312 HXB2)	gp120(302-311) NOTES: • Longitudinal	 120(302-311) RPNNNTRKSI OTES: Longitudinal study of epitope variation in vivo 	HIV infection	human(B7)	[Wolinsky96]
gp120(303-312 IIIB)	gp120(302-311) NOTES:	RPNNNTRKSI	HIV-1 infection		[Walkerpercom96]
	 Epitope defin study RPNNNTRK to recognize t 	Epitope defined in the context of the Pediatric AIDS Foundation ARIEL Project, a mother-infant HIV transmission study RPNNNTRKDI and RPNNNTRKGI, naturally occurring variants, were found in non-transmitting mother – ability to recognize these variants has not yet been determined	Foundation ARIEL Proje ring variants, were founded	ct, a mother-infant HIV transmission in non-transmitting mother – ability	transmission her – ability
gp120(310-318 SF2)	gp120(309-317) NOTES:	IYIGPGRAF	HIV-1 infection	human(A*2402)	[IkedaMoore97]
	 Defined using anchors in HI This peptide i IYIGPGRAF specific CTL 	Defined using reverse immunogenetics – 59 HLA-A*2402 binding peptides were predicted by searching for A*2402 anchors in HIV proteins, (Tyr at 2, and Phe, Leu or IIe at the C term) – 53 of the 59 peptides bound A*2402 This peptide induced CTL in 1/4 HIV-1+ people tested IYIGPGRAF bound to A*2402 strongly, the epitope can be processed in a vaccinia construct and presented – no specific CTL clones were obtained	2402 binding peptides we at the C term) – 53 of the d	re predicted by searching for a se 59 peptides bound A*2402 accinia construct and present	g for A*2402 2402 :sented – no
gp120(V3)	gp120(307-324) NOTES:	TRKSIHIGPGRAFYTTGE	Gag/Env VLP	murine(Balb/C)	[Luo98]
	 Intramuscular mice induce V CTL response 	Intramuscular injection of chimeric gag-env virus like particles (VLPs) containing V3 loop sequences into Balb/c mice induce V3 specific CTL – TRKSIHIGPGRAFYTTGE is a B subtype consensus that stimulated a cross-reactive CTL response	e particles (VLPs) conta	ining V3 loop sequences sensus that stimulated a cr	into Balb/c coss-reactive
gp120(V3 loop HXB2)	gp120(310-324) NOTES:	20(310-324) RIQRGPGRAFVTIGK gag-V3 fusion TES: Gos V3 fusion protein immunication elicited V3 CTV regrees in mice.	gag-V3 fusion	$murine(H-2^d)$	[Griffiths93]
gp120(V3 loop HXB2)	gp120(310-324) NOTES:	RIQRGPGRAFVTIGK	Pr55 ^{9a9} -env VLPs	$murine(H-2^d)$	[Deml97]
	• Env bound to on the VLP	Env bound to virus like particles (VLPs) can elicit a CTL response that is dependent on the VLP	TL response that is deper	ndent on the amount of Env presented	nv presented

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	Intranasal peptide with cholera toxin as a mucosal adjuvant	$murine(H\text{-}2D^d)$	[Porgador97]
	NOTES: • IIIB peptide	referred to as R15K	·		
	IIIB peptidePeptide-specR15K was suMemory CTI	IIIB peptide referred to as R15K Peptide-specific CTLs were induced after <i>in vitro</i> restimulation with peptide-pulsed targets R15K was superior at inducing CTL compared to the RGPGRAFVTI, in contrast to the fin Memory CTL responses were induced	stimulation with peptidence RGPGRAFVTI, in cor	-pulsed targets ntrast to the findings of Nehete <i>et al.</i>	hete <i>et a</i> .
gp120(313-327 MN)	gp120(310-324)	RIHIGPGRAFYTTKN	DNA immunization	murine BALB/c (H- 2^d)	[Fomsgaard98]
	NOTES: • Enhanced B: DNA vaccine	TES: Enhanced B and CTL responses to the V3 region occur following epidermal inoculation by gene gun with a chimeric DNA vaccine of V3-hepatitis B surface antigen relative to a gp160 plasmid vaccine	cur following epidermal i tive to a gp160 plasmid v	noculation by gene gun wi	th a chime
gp120(V3 loop many strains)	gp120(310-324)	RIHIGPGRAFYTTKN	V3 loop peptides	$murine(H-2D^d)$	[Casement95]
	NOTES: • V3 peptides:	TES: V3 peptides from MN and SC induce murine CTL that are cross-reactive with diverse strains	hat are cross-reactive wit	h diverse strains	
gp120(313-327 MN)	gp120(310-324)	RIHIGPGRAFYTTKN	MN rgp120 with QS-21 adjuvant	$\mathrm{murine}(\mathrm{H-2D}^d)$	[Newman97]
	• MN vaccine	TES: MN vaccine induced CTL reactive with MN, IIIB and RF vaccinia expressed Env,	nd RF vaccinia expressec	l Env, but not this peptide	
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	IIIB rgp120 with QS-21 adjuvant	$murine(H-2D^d)$	[Newman97]
	NOTES: • IIIB vaccine	IES: IIIB vaccine induced IIIB type-specific CTL to this peptide (P18), and an additional Env CTL response that was	s peptide (P18), and an	additional Env CTL respo	onse that v
	cross-reactive				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(313-327 MN)	gp120(310-324)	RIHIGPGRAFYTTKN	peptide vaccine	murine BALB/c (H- 2^d)	[Ahlers96, Ahlers97]
	NOTES: • Vaccine const against the au • The peptide C • GM-CSF and	IES: Vaccine constructs containing helper, antibody and CTL peptide epitopes induce strong Th1, CTL and NAb responses against the autologous HIV-1 virus The peptide CTL response was as cross-reactive as one elicited by a vaccinia construct expressing rgp160 MN GM-CSF and IL-12 were the two cytokines most effective for inducing and boosting CTLs	L peptide epitopes induce to e elicited by a vaccinia c	strong Th1, CTL and N/ onstruct expressing rgp1 osting CTLs	Ab responses 60 MN
gp120(MN)	gp120(310-324) NOTES:	RIHIGPGRAFYTTKN	HIV-1 infection	chimpanzee	[Lubeck97]
	Epitope-specificCTL response nizing antibodies	Epitope-specific CTL detected in chimpanzees immunized with adenovirus-HIV-1 CTL response may account for protection against subsequent HIV-1 SF2 challenge izing antibodies	nized with adenovirus-HI sequent HIV-1 SF2 challe	V-1 MN gp160 recombinant .nge in a chimpanzee lacking neutral-	nant king neutral-
gp120(315-329	gp120(310-324)	RIQRGPGRAFVTIGK	HIV exposure	human	[Pinto95]
ши)	NOTES: • CTL and T he	OTES: • CTL and T helper cell reactivity in healthcare workers exposed to HIV	s exposed to HIV		
gp120(315-329)	gp120(310-324) NOTES: • V3 loop CTL	20(310-324) RIQRGPGRAFVTIGK TES: V3 loop CTL response in mice vaccinated with gp160	vaccinia IIIB gp160	$murine(H-2D^d)$	[Takahashi88]
gp120(315-329	gp120(310-324)	RIQRGPGRAFVTIGK	IIIB peptide	$\operatorname{murine}(D^d)$	[Takahashi89a]
,	NOTES: • R(8) F(10) M	TES: R(8) F(10) MHC/peptide interaction			
gp120(315-329	gp120(310-324)	RIQRGPGRAFVTIGK	IIIB peptide	$\operatorname{murine}(D^d)$	[Sastry92]
11111)	NOTES: • Free peptide i	TES: Free peptide injected into the footpad of a mouse could stimulate specific CTL	ld stimulate specific CTL		
gp120(315-329	gp120(310-324)	RIQRGPGRAFVTIGK	HIV-1 infection	human(A2)	[Dadaglio91]
	NOTES: • Defined throu	TES: Defined through blocking CTL activity, and Env deletions	ions		

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	HIV-1 infection	human(A2)	[Clerici91]
***************************************	NOTES: • Helper and cy	TES: Helper and cytotoxic T cells can be stimulated by this peptide (P18)	is peptide (P18)		
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	rec vaccinia gp160	murine(H-2D d,p,q , H-2 u)	[Shirai96]
,	NOTES: • Multiple muri	ITES: Multiple murine MHC can cross-present this epitope (P18) and HP53, DRVIEVVQGAYRAIR, to specific CTL	e (P18) and HP53, DRVIE	EVVQGAYRAIR, to spec	sific CTL
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	V3:Ty-Virus-like particles	$murine(H-2^d)$	[Layton93]
,	NOTES: • V3-Ty-Virus-	TES: V3-Ty-Virus-like particles can induce type-specific CTL in mice in the absence of	CTL in mice in the absenc	e of adjuvant	
gp120(315-329	gp120(310-324)	RIQRGPGRAFVTIGK	vaccinia IIIB gp160	human(A11)	[Achour94]
***************************************	NOTES: • One of 3 HL.	TES: One of 3 HLA type restrictions associated with this peptide	peptide		
gp120(315-329	gp120(310-324)	RIQRGPGRAFVTIGK	gp160 vaccinia	human(A2,A3)	[Achour93]
, , , ,	NOTES: • Two of 3 HL.	TES: Two of 3 HLA type restrictions associated with this peptide	peptide		
gp120(313-327 MN)	gp120(310-324)	RIHIGPGRAFYTTKN	MN gp160 vaccinia	$murine(D^d)$	[Takahashi89b]
*****	NOTES: • Y(11 MN) ex	TES: Y(11 MN) exchange with V(11 IIIB) interchanges specificities	pecificities		
gp120(313-327 MN)	gp120(310-324)	RIHIGPGRAFYTTKN	HIV exposure	human	[Pinto95]
******	NOTES: • CTL and T he	OTES: CTL and T helper cell reactivity in healthcare workers exposed to HIV	ers exposed to HIV		
gp120(313-327	gp120(310-324)	SITKGPGRVIYATGQ	RF gp160 vaccinia	$murine(D^d)$	[Takahashi92]
,	NOTES: • Comparison c	TES: Comparison of MN, IIIB, and RF specificities, position 11 is critical	ion 11 is critical		

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	peptide immunization	$\operatorname{murine}(D^d)$	[Ahlers97a]
	NOTES: • PCLUS 3-18N	OTES: PCLUS 3-18MN synthetic peptide vaccine construct contained T1 helper epitope covalently linked to truncated P18	contained T1 helper epito	ppe covalently linked to tr	uncated P18
	 A substitution enhanced CTI Construct PCI 	CTL epitope A substitution in the T1 peptide stimulated an enhanced Th response and class II bi enhanced CTL induction by vaccine Construct PCLUS 3-18MN is currently in a phase I vaccine clinical trial	ced Th response and clas	ss II binding specificity, which in turn	hich in turn
gp120(315-329	gp120(310-324)	RIQRGPGRAFVTIGK	vaccinia IIIB gp160	$murine(H-2^{d,p,u,q})$	[Shirai92, Shirai93]
шь)	NOTES: • In a murine sy	TES: In a murine system multiple class I molecules can present this peptide, called P18, to	sent this peptide, called P	18, to CTL, including H-2D d , H-2D p ,	\mathbb{D}^d , H-2 \mathbb{D}^p ,
	 H-2D³, H-2L³ The MHC clas The V-β usage H-2^q 	The MHC class I molecule D^d as well as $H-2^{u,p,q}$, were found to present peptides P18 and HP53. The V- β usage in T cells showing cross-reaction between these two peptides was conserved for $H-2^{d,u,p}$, but not in $H-2^q$.	ere found to present pept veen these two peptides v	ides P18 and HP53 was conserved for H- $2^{d,u}$.	p, but not in
gp120(V3 loop SF2)	gp120(313-321)	IGPGRAFHT	gp120(SF2) DNA vaccine, rgp120 protein boost	$\mathrm{murine}(\mathrm{H-2D}^d)$	[Barnett97]
	NOTES: CTL were ind DNA vaccine Strains SF2 (I	TES: CTL were induced by vaccine, and restimulated <i>in vitro</i> with V3 peptide DNA vaccine with protein boost stimulated both CTL and antibodies Strains SF2 (IGPGRAFHT), US4 (IGPGRAFYA), and CM235 (IGPGQVFYR) were tested	tro with V3 peptide and antibodies GM235 (IGPGQVFY)	 were tested 	
gp120(V3 loop MN)	gp120(313-322)	IGPGRAFYTT	B. abortus-peptide conjugate	$murine(H-2D^d)$	[Lapham96]
	NOTES: • B. abortus-pej	IES: <i>B. abortus</i> -peptide conjugate induced a virus-specific CTL response in CD4+ lymphocyte depleted mice	CTL response in CD4+	lymphocyte depleted mic	C)
gp160(318-327) IIIB	gp120(313-322)	RGPGRAFVTI	DNA gp160 plas- mid + peptide boost	Macaca fuscata	[Okuda97]
	• Murine BALF boosted with a region	TES: Murine BALB/c (H-2 ^d) and macaque both showed highest level of CTL vaccine response when a DNA vaccine was boosted with a peptide including four peptide subtypes of the V3 region, HPG-30 and a fragment of the CD4 binding region	ghest level of CTL vacci	ne response when a DNA vaccine was 30 and a fragment of the CD4 binding	vaccine was 2D4 binding

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp160	gp120(313-322)	RGPGRAFVTI	Epitopes expressed in modified virus Ankara (MVA) DNA vectors	murine(H-2 ^d 17)	[Hanke98b]
	 NOTES: MVA is an a and expresse γ IFN and C An MVA boo 	TES: MVA is an attenuated vaccinia that can not replicate in mammalian cells – strings and expressed in a MVA DNA vector γ IFN and CTL activity were induced after a single vaccination An MVA boost enhanced the response	e in mammalian cells – see in cells – see	strings of CTL epitopes were delivered	were delive
gp120(318-327)	gp120(313-322) NOTES:	RGPGRAFVTI	HIV-1 infection	human	[Kmieciak98]
	Increased CTThis epitope inhibitory eff	Increased CTL response to cells expressing a VV construct Δ V3 mutant compared with a full-length env gene product This epitope doesn't have A2 anchors, but has features that confer promiscuous A2 binding, which may relate to the inhibitory effect seen in this paper	struct $\Delta V3$ mutant compres that confer promiscuo	ared with a full-length env gene product us A2 binding, which may relate to the	iv gene produc ay relate to the
gp160(318-327	gp120(313-322)	RGPGRAFVTI	IIIB peptide	$\mathrm{murine}(D^d)$	[Takahashi93]
шв)	NOTES: • Successful pr	OTES: • Successful priming with vaccination of peptide pulsed splenic dendritic cells	sed splenic dendritic cells		
gp120	gp120(313-322)	RGPGRAFVTI	Multi-epitope gene in VVA	murine $(H-2^d)$	[Hanke98c, Hanke98b]
	NOTES: • This murine recognized by a vaccinia vii. • The murine v	IES: This murine epitope was incorporated into a vaccine of CTL epitopes expressed together including 20 HIV epitopes recognized by humans from 12 HLA types, one murine HIV epitope and three macaque HIV epitopes, delivered in a vaccinia virus Ankara (VVA) construct The murine vaccination was more effective at generating CTL when given i.v. rather than i.m.	e of CTL epitopes express rine HIV epitope and thr ating CTL when given i.v	sed together including 20 ee macaque HIV epitop v. rather than i.m.) HIV epitopes es, delivered in
gp160(318-327	gp120(313-322)	RGPGRAFVTI	IIIB peptide	$\operatorname{murine}(D^d)$	[Takahashi96]
	NOTES: • Exposure of CD8+ CTI to targets presensitized • The authors propose this peptide-MHC complex	Exposure of CD8+ CTL to free peptide corresponding to the epitope results in strong inhibition of the CTL response to targets presensitized with the same peptide The authors propose this is due to a "self-veto", where the CTL is inactivated by a CD8+ cell carrying the appropriate peptide-MHC complex	ng to the epitope results i	a strong inhibition of the CTL response by a CD8+ cell carrying the appropriate	CTL response

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp160(318-327 IIIB)	gp120(313-322)	RGPGRAFVTI	A rapidly degraded form of Env	$\operatorname{murine}(L^d)$	[Tobery97]
	NOTES: • An HIV-1 Env • The rapidly de • The rapidly de • Similar result	TES: An HIV-1 Env vaccine was targeted for rapid cytoplasmic degradation The rapidly degraded form rapidly stimulated CTL to this peptide, faster than the normal vaccinia-env The rapidly degraded form also stimulated greater specific CTL lysis and higher CTLp frequencies than normal Env Similar results were obtained for a Nef protein designed for rapid degradation	mic degradation this peptide, faster than t cific CTL lysis and highe ed for rapid degradation	he normal vaccinia-env r CTLp frequencies than	normal Env
gp160(318-327 IIIB)	gp120(313-322)	RGPGRAFVTI	Combination peptide vaccine	murine BALB/c (H- 2^d)	[Hamajima97]
	NOTES: • B cell epitope • Vaccine comb • IL-12 express	TES: B cell epitope HGP-30 also serves as a CTL epitope Vaccine combined HGP-30, V3 loop peptide variants, and CD4 binding site peptide IL-12 expression plasmid included with the vaccination enhanced the CTL response	and CD4 binding site pe n enhanced the CTL res	ptide ponse	
gp160(318-327 IIIB)	gp120(313-322)	RGPGRAFVTI	IIIB peptide	murine(D)	[Nehete95]
	NOTES: • RGPGRAFV' • This peptide,	TES: RGPGRAFVTI was defined as the optimal peptide for vaccination, out of RIQRGPGRAFVTIGK This peptide, in a carrier-free form in Freund's adjuvant, could stimulate Env specific CTL in BALB/c mice	rvaccination, out of RIQ	RGPGRAFVTIGK pecific CTL in BALB/c r	nice
gp160(318-327 IIIB)	gp120(313-322)	RGPGRAFVTI	CTL line from HIV-donor	human(A2.1)	[Alexander-Miller96]
	NOTES: • This immuno: • The same opti	TES: This immunogenic peptide does not have the known binding motif for A2.1 The same optimal peptide for this human HLA-A2.1 epitope was observed for a murine H-2 D^d epitope	inding motif for A2.1 pitope was observed for	a murine H-2 \mathbf{D}^d epitope	
gp120(V3 loop MN)	gp120(313-322)	IGPGRAFYTT	B. abortus-peptide conjugate	$murine(H-2D^d)$	[Lapham96]
	NOTES: • B. abortus-per	TES: B. abortus-peptide conjugate induced a virus-specific CTL response in CD4+ lymphocyte depleted mice	CTL response in CD4+ I	ymphocyte depleted mico	c
gp160(318-327)	gp120(313-322)	RGPGRAFVTI	peptide	$murine(H-2D^d)$	[Takeshita95]
	NOTES: • XGPXRXXX	TES: XGPXRXXXXI are critical for binding, consistent with H-2D d motif XGPX(RKH)XXX(X)(LIF)	th H-2D ^d motif XGPX(F	(KH)XXX(X)(LIF)	

	gp120(318-327 IIIB)		gp160(318-327 SIMI)		gp160(318-327 IIIB)		gp120(312-320 SF2)	Location
 Three class I MF other haplotypes The amino acids 	gp120(313-322)	NOTES: Individual wa P18 MN and I thus the P18 IIIB The P18 IIIB gp160 SIMI I or P18RF per	gp120(313-322)	 Lysis only occ CTL Restimulating SIMI specific 	gp120(313-322) NOTES: • Individual wa	NOTES: • Murine CTL rangene regulated • CTL response rangeline soluble protein	gp120(313-321)	WEAU
Three class I MHC, H-2 ^{d,p,u} , that differ in sequence and serology, cross-present this peptide to T-cells of each of the other haplotypes The amino acids R, F, and I are each critical for strong CTL activity with all three MHC molecules	RGPGRAFVTI	Individual was immunized with rec vaccinia gp160 SIMI and boosted with purified recombinant gp160 SIMI Individual was immunized with rec vaccinia gp160 SIMI and boosted with purified recombinant gp160 SIMI P18 MN and RF peptides were able to stimulate the HIV specific CTL that arose in response to the SIMI vaccination, thus the P18 MN peptide (IGPGRAFYTT) and the P18 RF peptide (KGPGRVIYAT) could cross-react The P18 IIIB peptide does not cross-react (RGPGRAFVTI in the epitope region) gp160 SIMI primed immune cells could generate a significantly broader specificity when stimulated with P18 MN or P18RF peptides, but not P18 IIIB	MGPKRAFYAT	Lysis only occurs with IIIB P18 peptide pulsed onto autologous targets, MN, RF, SIMI P18 peptides fail to stimulate CTL Restimulating immune cells from gp160 IIIB vaccinees with MN, RF, or SIMI P18 did not enhance the MN, RF, or SIMI specific CTL response	20(313-322) RGPGRAFVTI vaccinia IIIB gp160 hu TES: Individual was immunized with rec vaccinia gp160 IIIB and boosted with purified	TES: Murine CTL response to peptide observed after immunization with DNA plasmid containing HIV-1 (SF2) gp120 gene regulated by bacteriophage T7 promoter CTL response required coadministration of rec vaccinia virus expressing T7 RNA polymerase or T7 RNA polymerase soluble protein	IGPGRAFHT	Sequence
e and serology, cross-pressong CTL activity with all	vaccinia IIIB gp160	SIMI and boosted with pour HIV specific CTL that are P18 RF peptide (KGPGR RAFVTI in the epitope regularisticantly broader spe	vaccinia SIMI gp160	nees with MN, RF, or SIM	vaccinia IIIB gp160 IIIB and boosted with pu	nmunization with DNA p	DNA gp120- plasmid immunization	Immunogen
ent this peptide to T-cells three MHC molecules	$murine(H-2^{d,p,u})$	urified recombinant gp160 SIMI see in response to the SIMI vaccination, VIYAT) could cross-react ion) cificity when stimulated with P18 MN	human(A2)	RF, SIMI P18 peptides fail to stimulate	human(A2) rified gp160	lasmid containing HIV-1	$\operatorname{murine}(D^d)$	Species(HLA)
of each of the	[Shirai97]	O SIMI I vaccination, with P18 MN	[Achour96]	il to stimulate e MN, RF, or	[Achour96]	(SF2) gp120 A polymerase	[Selby97]	References

Location W	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(318-327 gp	gp120(313-322)	RGPGRAFVTI	rec vaccinia-gp160	$murine(H-2^d)$	[Goletz97]
N	NOTES: • Anthrax lethal • A fusion protei processed alloy	Anthrax lethal toxin can deliver proteins to the cytosol of eukaryotic cells A fusion protein linking the delivery domain of the anthrax protein to gp120 achieved cellular uptake, and gp120 was processed allowing presentation of this V3 epitope to CTL <i>in vitro</i>	l of eukaryotic cells hrax protein to gp120 ach CTL <i>in vitro</i>	ieved cellular uptake, and	d gp120 was
gp120(314-322) gp N(gp120(316-324) NOTES: • Study of peptic	120(316-324) GRAFVTIGKOTES:Study of peptide binding to HLA-B27	no CTL shown	human(B27)	[Jardetzky91]
gp120(337-368 gp LAI) N(gp120(340-364) NOTES: CD4+ CTL clc	120(340-364) KWNNTLKQIDSKLREQF- gp160 vaccinia GNNKTIIF vaccine OCD4+ CTL clones were obtained from an HIV-1 vaccinia-env vaccinee	gp160 vaccinia vaccine inia-env vaccinee	human(CD4+ CTL)	[Johnson94c]
gp120(339-361 gp LAI) N(gp120(342-359) NOTES: CD4+ CTL isc	• CD4+ CTL isolated from LAI IIIB gp160 vaccinees	gp160 vaccinia	human(CD4+ CTL)	[Johnson94]
gp120(374-380 gp BRU) N(gp120(373-379) NOTES:	20(373-379) PEIVTHS HI TES:	HIV-1 infection	human(A2)	[Dadaglio91]
gp120(376-383 gp PV22) N(gp120(379-387) SFI NOTES: • Conserved epitope	SFNCGGEFF	HIV-1 infection	human(Cw4)	[Johnson93]
	-				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(376-383 PV22)	gp120(379-387)	SFNCGGEFF	CTL not shown	human(Cw4)	[Wolinsky96]
	NOTES: • Longitudinal	TES: Longitudinal study of epitope variation <i>in vivo</i>			
gp120(375-383	gp120(379-387)	SFNCGGEFF	HIV-1 infection	human(B15)	[Wilson97]
ļ	NOTES: • This is the optimal pepti molecules, Cw4 and B15	TES: This is the optimal peptide for two CTL clones that recognize this epitope in the context of two different HLA molecules, Cw4 and B15	at recognize this epitop	e in the context of two	different HLA
	Predominant recognizedRecognition or	Predominant form in proviral DNA of the individual with B15 restricted CTL was SFTCGGEF recognized Recognition of a minor autologous variant (SFNCRGEFF) from the B15 donor was greatly reduced	lual with B15 restricted GEFF) from the B15 do	CTL was SFTCGGEFF and this was nor was greatly reduced	F and this was
gp120(375-383	gp120(379-387)	SFNCGGEFF	HIV-1 infection	human(Cw4)	[Wilson97]
	NOTES: This is the optimal peptimolecules, Cw4 and B15 Only one form (TFNCGCIIIB peptide	TES: This is the optimal peptide for two CTL clones that recognize this epitope in the context of two different HLA molecules, Cw4 and B15 Only one form (TFNCGGEFF) was found in the Cw4 donor and this form reacted with the CTL line similarly to the IIIB peptide	at recognize this epitop	e in the context of two acted with the CTL line	different HLA similarly to the
gp120(376-384	gp120(380-388)	FNCGGEFFY	HIV-1 infection	human(A29)	[Wilson97]
шь)	NOTES: • This is the op • FNCRGEFFY or no stimula • The IIIB forr with the FNC	This is the optimal peptide for two CTL clones derived from two different donors FNCRGEFFY and FNCRGGFFY are major and minor autologous variants in one of the donors, and showed reduced or no stimulatory activity for CTL from the host The IIIB form and the form FNCAGEFFY were present in the other donor, and the CTL line had reduced activity with the FNCAGEFFY form relative to the index peptide	ved from two different d or autologous variants in esent in the other donor ptide	onors n one of the donors, and s , and the CTL line had 1	showed reduced educed activity
gp120(376-384	gp120(380-388)	FNCGGEFFY	HIV-1 infection	human(A29)	[Brander96]
LAN)	NOTES: • C. Wilson, in	TES: C. Wilson, in press in J. Virol.			

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(381-392 BRU)	gp120(380-391)	KNCGGEFFYCNS	HIV-1 infection	human(A2)	[Dadaglio91]
	NOTES: • Defined through	TES: Defined through blocking CTL activity, and Env deletions	ions		
gp120(385-393)	gp120(387-395)) NOTES:	FYCNTTQLF	HIV-1 infection	human(A*2402)	[IkedaMoore97]
	 Defined using anchors in HIV This peptide ii FYCNTTQLF specific CTL or 	Defined using reverse immunogenetics – 59 HLA-A*2402 binding peptides were predicted by searching for A*2402 anchors in HIV proteins, (Tyr at 2, and Phe, Leu or IIe at the C term) – 53 of the 59 peptides bound A*2402 This peptide induced CTL in 1/4 HIV-1+ people tested FYCNTTQLF bound to A*2402 strongly, the epitope can be processed in a vaccimia construct and presented – two specific CTL clones were obtained	2402 binding peptides we at the C term) – 53 of the desired of the can be processed in a vector of the can be proved in the can be processed in a vector of the can be process	he 59 peptides bound A*2402 accinia construct and presente	; for A*2402 2402 sented – two
gp120(377-387)	gp120(381-391) NOTES: • Peptides recog	20(381-391) NSGGEFFYSNS TES: Peptides recognized by class I restricted CTL can bind to class II	d to class II	human(A2)	[Hickling90]
gp120(421-440	gp120(417-436)	LPCRIKQFINMWQEVGKAMY	HIV-1 infection	human(A2)	[Dadaglio91]
EAI)	NOTES: • Defined through	TES: Defined through blocking CTL activity, and Env deletions	ions		
gp120(410-429	gp120(417-430)	LPCRIKQFINMWQE	HIV-1 infection	human(DR4 CD4+)	[Siliciano88]
115000)	NOTES: • CD4+ CTL re	OTES: • CD4+ CTL restricted by class II HLA-DR4, targets primed by CD4 mediated uptake of gp120	rimed by CD4 mediated	uptake of gp120	
gp120(424-432 HXB2)	gp120(420-428)	RIKQIINMW		human(A32)	[Harrer96b]
gp120(424-432	gp120(420-428)	RIKQFINMW	HIV-1 infection	human(A32)	[Ray98]
<i>L</i> /11/	NOTES: • Autologous vi found	TES: Autologous virus was used to detect CTL in two individuals, and in both cases strain-specific autologous CTL were found	riduals, and in both cases	s strain-specific autologou	ıs CTL were
	The autologoutively, and all	The autologous epitope sequence was RIKQIINMW, MN and RF were KIKQFINMW and RIKQFVNMW respectively, and all were reactive with CTL clones	MN and RF were KIKQ	PEINMW and RIKQFVN	MW respec-

***************************************	gp120(428-443	, mb)	gp120(428-443		gp120(421-440		gp120(MN)	, me	gp120(428-443	, mb)	gp120(428-443	Location
NOTES: • Helper and cy	gp120(422-437)	NOTES: • Helper and cy	gp120(422-437)	NOTES: • Defined throu	gp120(422-436)	 Epitope-specific CTL response n izing antibodies Helper and cyto 	gp120(422-437)	NOTES: • CTL and T he	gp120(422-437)	NOTES: • In a murine s	gp120(422-437)	WEAU
TES: Helper and cytotoxic T cells can be stimulated by this peptide (T1)	KQIINMWQEVGKAMYA	TES: Helper and cytotoxic T cells can be stimulated by this peptide (T1)	KQIINMWQEVGKAMYA	TES: Defined through blocking CTL activity, and Env deletions	KQFINMWQEVGKAMY	Epitope-specific CTL detected in chimpanzees immunized with adenovirus-HIV-1 MN gp160 recombinant CTL response may account for protection against subsequent HIV-1 SF2 challenge in a chimpanzee lacking neutralizing antibodies Helper and cytotoxic T cells can be stimulated by this peptide (T1)	gp120(422-437) KQIINMWQEVGKAMYA NOTES:	TES: CTL and T helper cell reactivity in healthcare workers exposed to HIV	KQIINMWQEVGKAMYA	TES: In a murine system multiple class I molecules can present to CTL	KQIINMWQEVGKAMYA	Sequence
his peptide (T1)	HIV-1 infection	his peptide (T1)	HIV-1 infection	eletions	HIV-1 infection	nunized with adenovirus-Fubsequent HIV-1 SF2 chal	HIV-1 infection	ers exposed to HIV	HIV exposure	present to CTL	vaccinia IIIB gp160	Immunogen
	human(A2)		human(A2)		human(A2)	HV-1 MN gp160 recombinant lenge in a chimpanzee lacking	chimpanzee		human		$\operatorname{murine}(\operatorname{H-2}^{a,b,f})$	Species(HLA)
	[Cease87]		[Clerici91]		[Dadaglio91]	binant ເcking neutral-	[Lubeck97]		[Pinto95]		[Shirai92]	References

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(439-458 IIIB)	gp120(433-452)	KAMYAPPISGQIRCSSNITG	HIV-1 Pr55gag VLP with gp120 or V3+CD4 linear domains	Macaca mulatta	[Wagner98]
	NOTES: • A VLP is a novel vLPs bound to the Ab response to the Not V3+CD4 SHIV chimer call the CTL specific	A VLP is a non-infectious virus like particle self-assembled from HIV Pr55 gag – macaques were immunized with VLPs bound to either gp120 or V3+CD4 linear domains – gag and env specific CTL were stimulated in each case, and Ab response to gag and gp120 and was elicited, but the gp120 neutralizing response occurred only with whole gp120, not V3+CD4 – despite the CTL and Ab response, immunized macaques were infected by intervenous challenge with SHIV chimeric challenge stock CTL specific for this epitope could be found both before and after SHIV challenge	embled from HIV Pr55 g ns – gag and env specific e gp120 neutralizing resp nunized macaques were i fore and after SHIV chall	gag – macaques were immunized with CTL were stimulated in each case, and onse occurred only with whole gp120, infected by intervenous challenge with lenge	nunized with ach case, and whole gp120, nallenge with
gp120(431-440)	gp120(435-444)	MYAPPIGGQI	synthetic peptide	$murine(H-2K^d)$	[Duarte96]
	• Tolerization c	Tolerization of CTL response with continued administration of soluble peptide	stration of soluble peptid	e	
gp120(494-513 BRU)	gp120(491-510)	VKIEPLGVAPTKAKRRVVQR	HIV-1 infection	human(A2)	[Dadaglio91]
	NOTES: • Defined throu	TES: Defined through blocking CTL activity, and Env deletions	tions		
gp120(IIIB)	gp120		gp120 or gp160 DNA vaccine	Rhesus monkeys	[Shiver97]
	NOTES: • DNA vaccina response	TES: DNA vaccinations of Rhesus monkeys with a gp120 or gp160 DNA vaccine elicited a strong CD8 cytotoxic T cell response	or gp160 DNA vaccine	elicited a strong CD8 cy	otoxic T cell
gp160	gp120 NOTES:	polyclonal	HIV-1 infection	Macaca nemestrina	[Kent97b]
	 Macaques can be immune response A strong CTL response 	Macaques can be infected with HIV, and clear the infection within 6 months, so it is immune response A strong CTL response against env, pol and gag antigens can be detected The CTL response needed by A weeks and declined decreased by the strong can be detected.	ection within 6 months, so gens can be detected) it is of interest to examine their initial	ne their initial
	• The response	The response in the lymph nodes and peripheral blood was comparable	d was comparable		

Location gp160	WEAU Sequence gp120
	 NOTES: A gag/pol, vif or env DNA vaccine, when delivered in conjuction with the plasmid encoding the co-stimulatory molecules B7 and IL-12, gave a dramatic increase in both the cytotoxic and proliferative responses in mice When IL-12 was present, CTL response could be detected even without <i>in vitro</i> stimulation
gp160(env)	gp120
	 NOTES: A gag/pol or env DNA vaccine, when delivered in conjuction with the plasmid encoding the co-stimulatory molecules CD86, gave a dramatic increase in both the cytotoxic and proliferative responses in mice When CD86 was present, CTL response could be detected even without <i>in vitro</i> stimulation
gp120(gp160 HXBc2)	gp120 polyclonal
	NOTES: • Vaccination of Macaques mulatta (Rhesus monkeys) with a HXBc2 env DNA prime and a protein boost elicited a T-cell proliferative response, a CTL response, and type-specific neutralizing antibodies • Vaccinated animals challenged with SHIV-HXB2 were protected from infection
gp120(env MN)	gp120 polyclonal
	 NOTES: An HIV DNA env and rev vaccine given to 15 asymptomatic HIV+ individuals at three different dosages, 30, 100 or 300 μg, was safe The CTL response to gp120 was enhanced in 0/4 patients in the 30 μg group, 2/3 patients in the 100 μg group, and 0/3 in the 300 μg group – but the non-responding patients in the 300 μg group had a strong CTL response prior to vaccination, and the CTL results are inconclusive

WEAU Sequence	Immunogen	Species(HLA)	References
gp120 NOTES:	HIV infection	human	[Trickett98]
 12 HIV-1 infected patients were re-infused with the infection Improvement in CD4+ and CD8+ T cells was see one patient 	heir own lymphocytes, cr n in 7/12, and an increas	yopreserved from an earlier and the CTL response to En	time point in v was seen in
gp120 NOTES:	HIV infection	human	[Legrand97]
 17 recently infected patients were tested for CTL An early response (within a month following PI) Nef Early responses to Pol, Rev, Vif and Tat were rare 	response to HIV proteins was noted in 87% of the	s Env, Gag, Pol, Rev, Nef, V subjects to Gag, 75% to Em	if and Tat v, and 50% to
OTES:	HIV infection	human	[Corey98]
 Vaccinia-naive subjects were vaccinated with vac MN 	ccinia-gp160 LAI and bo	osted with gp120 SF2, LAI	, MN, or 160
• 26/51 had an anti-Env CTL response, and those th autologous laboratory strains with some cross-rea	at were boosted with gp1 activity	20 tended to produce Abs th	at neutralized
OTES:	HIV-1 infection	human	[Betts97]
 6/8 individuals from Zambia infected with C clade IIIB vaccinia expressed Gag, Pol and Env protein A vigorous cross-clade response was not limited proteins varied among the six patients 	e virus had CTL that wers	e able to make response to F and the level of recognition	3 clade HIV-1
	gp120 NOTES: • 12 HIV-1 infected patients were re-infused with the infection • Improvement in CD4+ and CD8+ T cells was see one patient gp120 NOTES: • 17 recently infected patients were tested for CTL • An early response (within a month following Pl) Nef • Early responses to Pol, Rev, Vif and Tat were rare • Vaccinia-naive subjects were vaccinated with valued MN • 26/51 had an anti-Env CTL response, and those the autologous laboratory strains with some cross-real autologous laboratory strains with some cross-real lill vaccinia expressed Gag, Pol and Env protein • A vigorous cross-clade response was not limited proteins varied among the six patients	Immunogen Il 20 OTES: Il 2 HIV-1 infected patients were re-infused with their own lymphocytes, or the infection Improvement in CD4+ and CD8+ T cells was seen in 7/12, and an increase one patient Il 20 If recently infected patients were tested for CTL response to HIV infection OTES: If response (within a month following PI) was noted in 87% of the Nef Early responses to Pol, Rev, Vif and Tat were rare HIV infection OTES: Vaccinia-naive subjects were vaccinated with vaccinia-gp160 LAI and bo MN 26/51 had an anti-Env CTL response, and those that were boosted with gp1 autologous laboratory strains with some cross-reactivity HIV-1 infection OTES: 6/8 individuals from Zambia infected with C clade virus had CTL that wer IIIB vaccinia expressed Gag, Pol and Env proteins A vigorous cross-clade response was not limited to a particular protein, proteins varied among the six patients	Sequence HIV-1 infected patients were re-infused with their own lymphocytes, cryos infection sprovement in CD4+ and CD8+ T cells was seen in 7/12, and an increase in e patient HIV infection S: recently infected patients were tested for CTL response to HIV proteins E rearly response (within a month following PI) was noted in 87% of the suffy responses to Pol, Rev, Vif and Tat were rare HIV infection S: N V51 had an anti-Env CTL response, and those that were boosted with gp120 tologous laboratory strains with some cross-reactivity HIV-1 infection S: Sindividuals from Zambia infected with C clade virus had CTL that were a B vaccinia expressed Gag, Pol and Env proteins vigorous cross-clade response was not limited to a particular protein, ar atteins varied among the six patients

	Env		Env	Location
NOTES: • pCMV160/Rev is a DNA vaccine candidate carrying gp160 and Rev linked to a cytomegalovirus (CMV promotor)	DNA vaccine pCMV160/Rev	 CD3+ cells that also carry a natural killer cell receptor (NKR+) can exhibit down regulation of T-cell function Anti-NKR IgM MAb masked this inhibitory function and increased HIV-1 specific CTL activity in phytohemagglutinin-activated PBMC cultured in the presence of IL-2 from 3/5 patients, and in one other case anti-NKR MAb brought HIV-1 specific CTL activity to detectable levels 	NOTES.	WEAU
			HIV-1 infection	Sequence
				Immunogen
	murine(H- 2^d)	nibit down regulation of T-cell function reased HIV-1 specific CTL activit 2 from 3/5 patients, and in one other is	human	Species(HLA)
	[Ishii97]	cell function CTL activity in in one other case	[DeMaria97]	References